REMARKS

Claims 1-25 are pending in the application. Claims 1-3, 5, 6, 8, 14-21 and 23-25 stand rejected and are at issue herein. Claims 4, 7, 9-13, and 22 are merely objected to as being dependent upon a rejected base claim, but have been indicated to be otherwise allowable over the prior art of record. Claims 4, 7, 9, 19, 21 and 22 have been amended as indicated hereinabove. A replacement Specification containing paragraph numbers and correcting a printer error with regard to printing mathematical symbols is included herewith. Claims 1-25 remain pending in this application, and reconsideration of the rejection and objections to these claims in view of the foregoing amendments and following remarks are respectfully solicited.

The Office has indicated that claims 1-3, 5-6, 8, 14-21, and 23-25 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Lippincott (U.S. Patent No. 6,459,825). The Applicant has thoroughly reviewed the Lippincott '825 patent and the Examiner's rationale set forth in the Official Action. Based on this thorough analysis, the Applicant must respectfully traverse this ground of rejection with regard to claims 1-3, 5, 6, 8, 14-18, 21, and 23-25, and respectfully submits that this ground of rejection has been overcome with regard to claims 19 and 20 in view of the foregoing amendment to claim 19 above. Reconsideration of this ground of rejection and indication of the allowability of claims 1-3, 5, 6, 8, 14-21, and 23-25 at an early date are respectfully solicited.

The system and method of Lippincott '825 is described as being "applicable to demanding photo-optical applications where scanner equipment is required to image capture at the highest quality image resolution and fidelity possible." Lippincott '825, column 1, lines 13-19. Indeed, one of the objects and advantages listed is "to provide a fully artificially intelligent color image scanner, that can be used by typical users, and still obtain the imaging industry's highest quality photo image capture." *Id* at column 4, lines 24-27. This object is achieved, in part, by developing a learned knowledge database of various photo media properties and scanner device properties. To fill this database, a standardized film target is exposed or printed on all types of photo and print media including transparency positive (photochrome), transparency negative, photo dye print and screened ink print media. *Id* at column 6, lines 6-15. The details of this standard target are described as being "critically necessary" in order to accurately map the detail inverse color density space of negative film as well as to increase the accuracy of data representatives of shadow detail towards black or other high fidelity positive photo quality media. *Id* at column 6, lines 42-47.

Of importance, Lippincott '825 distinguishes the use of other industry standard color targets like the Kodak Q60 and ISO standard IT8 committee chart, and those designed for positive print human perceivable color representations in ICC format. Such targets are specifically provided for in the Applicant's Specification. This standard target is exposed to film and is measured with ISO standard status A, M, or T densometer instruments at controlled luminous temperatures of 2,950°K, 3,200°K, and 500°K and viewed via a high-powered scale-equipped microscope 42. The same exposure target is scanned on the scanner where the scanner's resultant raw output data is then based on its position indexed to corresponding intensity to known density value in process 44. This measure data is then normalized to a value of 0 to 1 for all points on the target. These photomedia specific properties are then recorded into a database.

The actual image acquisition process of Lippincott '825 begins with the user selecting the type of scanner so that the selected scanner's characteristics may be obtained from the scanner device properties database. The scanner then performs a high speed pre-scan, which is then analyzed to determine which of the photo media properties provides the closest match. The system of Lippincott '825 then computes a custom fit correction for the current film being scanned as a modification to the standard calibration properties. This is done by performing a histogram and exposure analysis to return intensity values with the population (quantity) of the intensity of pixels found in the sample between the scanner's white and black points. The histogram values are then converted to normalized values. The closest match photomedia property's color index table is then modified by stretching, interpolating the original points of the index table or calibrated media correction to pass through the actual new scan sample control points. As described in Lippincott '825, this provides the highest possible combined optical qualities of both traditional photography and digital scanner technologies.

Quite to the contrary to this sophisticated artificial intelligence-based system aimed at providing the highest quality image resolution and fidelity possible, the system and method of the present invention is designed to provide the "80%" solution that is needed by the mass market as described in the original Specification, page 12, lines 9-11. Indeed, the present invention was developed in view of the fact that typical users cannot afford the expensive calibration equipment, standardized targets, or calibration services, and yet still need to provide good fidelity for duplicated digital images used in e-commerce.

Unlike the artificial intelligence system of Lippincott '825 that requires a very specialized standard target, the system and method of the present invention allows the use of simple test targets such as the IT8 and Q60 targets specifically excluded by the system of

Lippincott '825 (see Lippincott '825, column 6, lines 30-54). Still further, the system and method of the present invention allows for the use of custom color targets providing at least 6 points, although acceptable results may be achieved with the present invention with as little as three color points plus the white and black samples as described on page 3 of the originally filed application. Further, the system and method of the present invention operates adequately with gray values that are not specifically in the middle of the black and white points as required by Lippincott '825, but may allow this gray to vary between 25-75%. Further, the calibration method of the present invention may be accomplished through the use of a simple spreadsheet program, such as Microsoft's Excel program, without requiring the sophisticated artificial intelligence and knowledge base of various media types and scanner properties all of which significantly increase the cost.

Once this relatively simple test target has been scanned and its values normalized, "they then are brought into the color capture device's color space 110. <u>This is unique to the method of the instant invention</u>. Typical methods require that the white point of the capture device be an "approved" white point. Unlike these prior methods, the instant invention works for any white point that exists for the capture device. This allows less expensive devices to be used in the capture device while still providing acceptable output and high color fidelity. Even if the capture device used a yellow light source, the image's output from the device after translation will have a high fidelity to the original image or object." Original Specification, page 15, line 21-page 16, line 7.

However, nothing in Lippincott '825 teaches or even suggests that the actual white point for the capture device, even if that capture device used a yellow light source, is used in its artificial intelligence color calibration method. Indeed, Lippincott '825 appears to teach away from such individual device white point transformation. Instead, Lipincott '825 requires that the user of any particular device select, by "scanner identification for manufacturer 60 model, and type 62" the properties for that model scanner from this knowledge base to be used in the calibration process. Lippincott '825, column 8, lines 14-20.

Of significance, Lippincott '825 describes that this knowledge base includes "the native mechanical resolution sampling sizes, in English and metric dimensions 64; optical number of visibility sizes (equivalent to a camera lens or aperture), and their specific sizes 66 as measured visible microns of light samples; full available scanner size 68; available digital address-ability of the scanner color system, as measured in bit depth of RGB; digital to analog converter and lookup tables 70; and, data available for return to computer 72; scanner hardware media focus capability e.g. multi-lens, contrast focus, fixed focus 74 format for raw data being received from the scanner interface 76." Lippincott, column 8, lines 20-31. It is

specifically noted by the Applicant that the information included in the scanner device dependent properties knowledge base does not include the white point chromaticity of the digital image capture device. As such, the Applicant respectfully submits that the method of Lippincott '825 utilizes a different approach for its color calibration than that required by the claims of the instant application.

Turning specifically to the claims, independent claim 1 requires, *inter alia*, that the normalized measurement values be converted to the digital image capture device white point chromaticity. The Office has indicated that this limitation is met as described in Lippincott '825, column 4, lines 56-60. However, this quoted section simply lists an object of the invention, to wit to provide maximum optical digital capture of the photo. This is achieved by "means of automatic digital sampling of the film media at a sample rate comparable to the maximum optical sample size relative to the physical analog film grain size. This process is applicable to continuous tone film media, screen size for ink printed media, and other sources." However, nothing in this quoted section describes or suggests that normalized measurement values from the digital image capture device should be converted to the device white point chromaticity. Instead, the cited section discusses that the maximum optical sample size should be similar to the physical analog film grain size of the photo to be scanned to provide the maximum optical digital capture of that photo. While Lippincott '825 considers this sampling size to be an important aspect of the digital capture of a photo, this in no way relates to converting normalized measurement values to the digital image capture device white point chromaticity as required by independent claim 1. As such, the Applicant respectfully submits that the Office has failed to identify a teaching of each and every limitation of independent claim 1 in Lippincott '825. As such, this reference cannot anticipate independent claim 1, nor those claims dependent thereon. Reconsideration of this ground of rejection is therefore respectfully solicited.

Additionally, independent claim 1 requires the step of regressing the normalized measurement values with the normalized raw color values to determine a first compensation matrix. To meet this limitation, the Office cites to Lippincott '825, column 9, lines 23-33. However, the Applicant has thoroughly studied this cited section, as well as the reference as a whole, and respectfully submits that the cited section does not teach the regression of normalized measurement values with normalized raw color values to determine a first compensation matrix as required by this independent claim 1. Specifically, the cited section discusses how histogram analysis is used to select the proper photo media property settings. Specifically, the cited section states "the closest match photo media properties color index table is then modified by stretching, interpolating the original points of the index table or

calibrated media correction to pass through the actual new scan sample control points. The result is that the deviation of exposures of this particular exposure now has an equivalent unique custom correction produced for it based on the pre-sample and the calibration standard. The custom color controls are then passed to her CLUT, DPI, Aperture Control process 120 for optimized selection settings and scanner device dependent formatting 122."

None of this cited section teaches or even suggests that a regression be performed between normalized measurement values and the normalized raw color values to determine a first compensation matrix as required by independent claim 1. Indeed, while this section does teach "stretching" and "interpolating the original points of the index table", neither stretching nor interpolating constitutes a mathematical regression as is specifically required by this limitation. Therefore, the Applicant respectfully submits that Lippincott '825, and in particular the cited section of column 9, lines 23-33, does not teach or even suggest "regressing the normalized measurement values with the normalized raw color values to determine a first compensation matrix" as is specifically required by independent claim 1. Therefore, the Applicant respectfully submits that independent claim 1, and those claims dependent thereon, are not anticipated by Lippincott '825. Reconsideration of this ground of rejection for this additional reason is therefore respectfully solicited.

Claim 5 requires that the step of capturing raw color values of the test target with the digital image capture device comprises the step of disabling any gamma correction function of the capture device prior to capturing raw color values of the test target. The Office has cited to Lippincott '825, column 5, lines 64-66 to provide such teaching. However, the Applicant has thoroughly examined this cited section, as well as the reference as a whole, and was unable to find any such teaching. Specifically, the cited section states "the photomedia custom requirements are matched to the available scanner device properties and provided as control information to the scanner." This does not teach or even suggest that any gamma correction function of the capture device be disabled prior to capturing raw color values of the test target.

However, Lippincott '825 does recognize that color capture devices include such gamma correction curves as described in column 2, lines 22-30. Specifically, Lippincott '825 explains that "computer scanners are typically manufactured with log curves built into the equipment in order to approximate (only) film response and to display attractive results to video gamma devices including computer monitors. However, all photo film densities are characterized not by log curves, but more generally "S" shaped curves that are unique to each material, with shadow and highlight detail fall off. Thus, spectral response shadow and highlight details are damaged or lost with log curve scanning." However, in describing how a

scan is to be performed in accordance with the invention of Lippincott '825, see FIG. 2 and associated description in column 8, lines 32-58, no mention is made of disabling such gamma correction function prior to performing the scan. Specifically, this section describes "the image acquisition process begins with the user interface 92 selection type of the scanner and the request to scan. The acquisition control and initiation 96 obtains the selected scanner's characteristics from the user requested scanner device properties 20 routine and then performs a high speed pre-scan...." As may be seen from this quoted section and the accompanying Figure 2 of Lippincott '825, no requirement that the gamma correction function of the capture device be disabled prior to scanning. Therefore, it cannot be said that Lippincott '825 provides any such teaching or even suggestion of this requirement of claim 5. Therefore, the Applicant respectfully submits that claim 5 is also in condition for allowance for this additional reason.

Claim 6 requires that the step of regressing the normalized measurement values with the normalized raw color values to determine a first compensation matrix comprises the steps of assigning the normalized measurement values from the test target converted to the capture device white point as the dependent data, and assigning the normalized raw color data as the independent data. These requirements are consistent with the mathematical definition of a regression, which defines the relationship between the mean value of a random variable and the corresponding values of one or more independent variables.

To meet this limitation the Office has cited to Lippincott '825, column 9, lines 20-26. However, this cited section of Lippincott '825 does not describe a regression whatsoever, and does not provide the requirement of assigning the normalized measurement values from the test target converted to the capture device white point as the dependent data and assigning the normalized raw color data as the independent data at all. Instead, the cited section discusses the computation of the color control curve for deviations from the samples corrected histogram control points. These offset differences are calculated for these differences in the same normalized (0-1) scale across the entire curve, and the closest match photomedia property color index table is then modified by stretching, interpolating the original data points of the index table or calibrated media correction to pass through the actual new scan sample control points. This text neither teaches nor suggests a regression whatsoever, and does not provide the specific requirements of claim 6 that the normalized measurement values from the test target converted to the capture device white point be assigned as the dependent data in the regression and that the normalized raw color data be assigned as the independent data in the regression. As such, the Applicant respectfully submits that this ground of rejection is

improper and should be removed. Reconsideration of this ground of rejection and indication of the allowability of claim 6 is therefore respectfully solicited.

Independent claim 19 requires, *inter alia,* the step of compensating the normalized color data with a compensation matrix in the color space of the capture device. As discussed above, Lippincott '825 does not utilize a compensation matrix in the color space of the capture device for compensating the normalized color data in its color calibration method. The Office has cited to Lippincott '825, column 9, lines 23-33 to provide such a teaching, however this cited section discusses only that the closest match Photo Media Properties Color Index Table is modified "by stretching, interpolating the original points of the index table or calibrated media correction to pass through the actual new scan sample control points." Nowhere in the cited section is a compensation matrix discussed, not to mention a compensation matrix <u>in the color space of the capture device</u>.

As discussed in the originally filed application, "once the test target measurement values have been normalized for the Q60 white point, they then are brought into the capture device's color space 110. This is unique to the method of the instant invention....This allows less expensive devices to be used in the capture device while still providing acceptable out put in high color fidelity. Even if the capture device used a yellow light source, the image's output from the device after translation will have a high fidelity to the original image or object." Original Specification, page 15, line 21-page 16, line 7. Further, the Applicant respectfully submits that it is improper to characterize a simple photo media property index table as a compensation matrix in view of the definition and use of the term matrix in the originally filed application. That is, the compensation matrix is defined as the mathematical sense, whereas the Photo Media Properties Color Index Table is simply a table listing the properties of various photo media as illustrated in FIG. 5 of Lippincott '825. As such, the Applicant respectfully submits that Lippincott '825 does not anticipate independent claim 19. Reconsideration of this ground of rejection and the rejection of all claims dependent upon claim 19 are respectfully solicited.

Amended claim 21 requires, *inter alia*, the step of compensating the normalized color data with a compensation matrix. As indicated above, the Applicant has utilized the term "matrix" in its commonly understood mathematical definition, the teaching of which is wholly absent from Lippincott '825. Further, claim 21 requires that the step of compensating the normalized color data with a compensation matrix comprises the step of calibrating the capture device through, *inter alia*, the steps of determining the white point chromaticity of the digital image capture device, converting the normalized measurement values to the digital image device color space, and regressing the normalized measurement values with the

normalized raw data values to determine the compensation matrix in the color space of the capture device. The Applicant respectfully submits that he has thoroughly analyzed the Lippincott '825 reference and those sections specifically cited by the Examiner, but that the teachings of these required steps are wholly absent therefrom.

Specifically, there is no teaching in Lippincott '825 of the step of determining the white point chromaticity for the digital image capture device. Instead, Lippincott '825 requires that the user select the scanner type by manufacturer model and type so that the predefined characteristics of that scanner type may be used in the method described therein. However, column 8 lines 14-31 describes that the information included in this knowledge base are "the native mechanical resolutions sampling sized, in English and metric dimensions 64; optical number of visibility sizes (equivalent to a camera lens or aperture), and their specific sizes 66 as measured visible microns of light samples; full available scanner size 68; available digital address-ability of the scanner color system, as measured in bit depth of RGB; digital to analog converter and lookup tables 70; and, data available for return to the computer 72; scanner hardware media focus capability, e.g. multi-lenses, contrast focus, fixed focus 74 format for raw data being received from the scanner interface 76." The information included in the knowledge base to characterize the scanner device does not include the white point chromaticity as specifically required by this step. Further, this step actually requires the determination of the white point chromaticity for the digital image capture device, and not some published manufacturer's spec for what the white point chromaticity might be, assuming that that particular device uses the "approved" light source, etc., such that its actual white point chromaticity matches the published manufacturer's suggested values.

Further, Lippincott '825 does not teach or even suggest the step of converting the normalized measurement values to the digital image capture device color space. The section of Lippincott '825 in column 7 cited by the Office indicates that the measured data are normalized to a value of 0-1 for all points on the target, then are referenced to the brightness/intensity RGB scanner values D max (black) and D min (white) and 18% densities (pure gray) are computed to determine the relevant scanner density range, white point, black point, and natural color curve. The resulting photomedia specific properties are recorded in database 22. However, this cited section is merely the calibration standardization process "necessary to create the photo media properties 22 and scanner device properties 20."

Further, this independent claim 22 also requires the step of regressing the normalized measurement values with the normalized raw color values to determine the compensation matrix in the color space of the capture device. However, as discussed above, Lippincott '825 does not perform any mathematical regression, but instead performs a histographic analysis

and then modifies the Photo Media Property Color Index Table by stretching, interpolating the original points of the index table or calibrated media correction. However, the determination of a histogram having intensity values with the population (quantity) of the intensity of pixels found in the sample between the scanner's white and black points in no way teaches or even suggests the performance of a mathematical regression of the normalized measurement values with the normalized raw color values to determine a compensation matrix in the color space of the capture device as required by this amended independent claim 21. As such, the Applicant respectfully requests reconsideration of this ground of rejection and indication of the allowability of claim 21.

Independent claim 23 is directed to a digital image capture device comprising a memory storage element having stored therein a compensation matrix calculated as a regression of normalized raw color data from a test target and normalized measurement data from the test target converted to the color space of the capture device. Lippincott '825, however, does not include a compensation matrix that is calculated as a regression of normalized raw color data from a test target and normalized measurement from the test target converted to the color space of a capture device as discussed at length above. Instead, Lippincott '825 utilizes two look-up tables, the photo media properties table 22 and the scanner device properties table 20. None of the data in either of these tables is determined via a regression of the normalized raw color data from a test target and normalized measurement data from the test target converted to the color space of the capture device. While Lippincott '825 discusses histographic analysis, interpolation, and stretching, none of these teach or suggest a regression utilizing the specific information included in independent claim 23. Therefore, the Applicant respectfully submits that claim 23 is not anticipated by Lippincott '825, and is in condition for allowance. Reconsideration of this ground of rejection and indication of the allowability of claim 23 and those claims dependent thereon at an early date are respectfully solicited.

The Examiner has indicated that claims 4, 7, 9-13 and 22 are merely objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicant wishes to thank the Examiner for his consideration of these claims, and the Applicant has complied with this suggestion. Specifically, the Applicant has amended claims 4, 7, 9, and 22 to independent form, claims 10-13 being dependent, ultimately, from claim 9. As such, the Applicant requests an indication of the allowability of claims 4, 7, 9-13, and 22 at an early date.

Conclusion

In view of the above, the Applicant respectfully submits that claims 1-25 are in condition for allowance, claims 4, 7, 9-13, and 22 having previously been indicated as being allowable over the prior art of record. Reconsideration of claims 1-25 and indication of their allowability at an early date are respectfully solicited.

If the Examiner believes that a telephonic conversation will aid in the resolution of any issues not resolved herein, the Examiner is invited to contact the Applicant's attorney at the telephone number listed below.

Respectfully submitted,

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Date: August 7, 2003